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DIRECTORATE OF  
INTELLIGENCE

# Intelligence Memorandum

THE ROLLING THUNDER PROGRAM: 31 MARCH - 30 JUNE 1968

JCS review completed.

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CENTRAL INTELLIGENCE AGENCY  
Directorate of Intelligence  
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INTELLIGENCE MEMORANDUM

The Rolling Thunder Program:  
31 March-30 June 1968

Summary

The ground rules adopted on 31 March 1968 brought about dramatic changes in the nature of the Rolling Thunder program. Almost all of North Vietnam's major military and economic target systems were freed from attack, and the program, more than ever before, became almost exclusively an interdiction campaign. The sharp focus of the current intense air campaign against the small logistics target system in the Panhandle of North Vietnam is inflicting high levels of damage and compounding North Vietnam's logistic problems. Despite these difficulties, Hanoi, through a vigorous program of countermeasures and resupply efforts, has kept the flow of men and supplies to South Vietnam at record levels.

The major characteristics of the US bombing program since 31 March are as follows:

1. The scale of the effort has not been reduced. More than 27,000 attack sorties delivered 67,000 tons of ordnance against targets in North Vietnam during the second quarter of 1968. This effort exceeds the quarterly averages of the 1967 program and is almost double the effort maintained during the first quarter of 1968.

2. The revised bombing program leaves almost 90 percent of the population and area of North Vietnam and almost all of

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the major military, economic, and transportation centers in the country free from air attack. Thus the new program is a concentrated and intensified campaign against the narrow logistics funnel through which almost all men and supplies destined for South Vietnam must flow. This system consists, however, of fleeting or small targets that are widely dispersed and extremely difficult to neutralize or to interdict.

3. The program is being carried out at a considerably reduced cost to the United States in terms of aircraft and personnel lost to enemy action. US plane losses have been reduced by more than half. During the second quarter of 1968, 29 combat losses were sustained by US aircraft, compared with 72 losses during the same period of 1967. More than half of the personnel downed during this period were rescued, compared with a rate of less than one-third during preceding periods of the Rolling Thunder program.

Although the current bombing program is extracting a higher price from North Vietnam in terms of damage inflicted and is compounding the difficulties of maintaining its logistic system, the flow of men and supplies to the South is being maintained at substantially increased levels. The major results of the campaign south of the 19th Parallel are as follows:

1. The results of armed reconnaissance attacks have increased dramatically. Road and rail cuts and damage to truck parks, transshipment and storage areas, and bridges are well above the results of previous campaigns. Effective truck losses during the second quarter of 1968, for example, were 70-percent higher than during the second quarter of 1967 and more than double those achieved during the first quarter of 1968.

2. North Vietnam has continued to pay a high tax in terms of manpower allocations. The civilian labor requirements

to counter the effects of the bombing south of the 19th Parallel have increased by about 15 percent since 31 March 1968. This labor has been obtained, however, by diverting bomb damage repair crews and transport workers from the northern part of the country. Some of the 80,000 to 100,000 full-time bomb damage and transport workers remaining in the North could probably be diverted to the war in the South if Hanoi were more certain that full-scale bombing would not be resumed.

3. Despite the extent of damage inflicted on the logistics system, a high level of supply and personnel movement to the South is being maintained. Traffic being moved through the Panhandle of North Vietnam during the second quarter of 1968 by the Chief Directorate of Rear Services increased by more than 150 percent above first-quarter levels. The infiltration of supplies and personnel from North Vietnam into South Vietnam during 1968 has been at unusually high levels. At least 116,000 North Vietnamese entered South Vietnam during the first half of 1968, about the same number that infiltrated during all of 1967. During July, at least 28,000 and possibly as many as 37,000 North Vietnamese are estimated to have entered South Vietnam. An additional 28,000 enemy personnel are expected to enter in August. The movement of supplies has been at similarly high levels. An estimated 225 tons of supplies a day were delivered into the Laotian Panhandle during the first six months of 1968. After deducting requirements in Laos, an estimated 160 tons a day were available for forwarding to South Vietnam, compared with only 70 tons a day in 1967.

Developments north of the 19th Parallel point clearly to Hanoi's determination to continue its support for the war in the South and to increase the country's capability to withstand any resumption of a full-scale air war in the North. The principal developments have been as follows:

1. Air defense capabilities have been continuously improved. The in-country inventory of fighter aircraft has increased from 25 to 34 aircraft. All airfields for jet operations have been repaired for full service, and two new airfields -- Yen Bai and Bai Thuong -- have become operational. SAM defenses, principally around Hanoi and Haiphong, have been improved and expanded from an estimated 25 to 30 battalions to 35 to 40 battalions.

2. Key rail/highway bridges have been repaired, and all rail lines in the North are open for through rail service with the exception of the relatively unimportant Hanoi-Lao Cai line. The North Vietnamese are taking full advantage of the bombing restrictions by constructing new roads and bypasses that will make the transport network even less vulnerable in the event that full-scale bombing is resumed.

3. Restoration of North Vietnam's war-damaged industry has focused on the electric power system and the Haiphong cement plant. Eight of the nine powerplants in the main electric power network are now in partial operation. This network is now operating at about 50 percent of prebombing capacity, compared with about 35 percent at the end of March and only 20 percent during much of 1967. The Haiphong cement plant is also in partial operation.

4. Port activity at Haiphong has increased and imports, particularly of petroleum, have been at record levels. By the end of June 1968, seaborne imports amounted to three-quarters of the total volume imported during all of 1967. The recent increases in port congestion are a reflection of the high level of imports rather than an inability to move goods through the port.

5. The morale of the civilian population has been given a new boost by the restriction of the bombing program. The regime, however, is being careful not to let the air of relaxation get out of hand; air and civil defense programs are being maintained at a high state of readiness. The emphasis in import programs on war-related goods has meant little improvement in the availability of consumer goods. The large amount of repair work still to be done in the North and the high level of transport activity are still tying up an estimated 80,000 to 100,000 full-time workers.

On balance, there have been both advantages and disadvantages to the United States from the revised Rolling Thunder program in effect since 31 March. The increased destruction of logistical targets in the Panhandle of North Vietnam is destroying a larger volume of goods directly related to the war in the South. However, the lack of major targets of national importance makes it impossible for air power to bring additional pressure on the regime by widespread disruption of the economy. The absence of an air campaign in the northern areas of the country permits North Vietnam to move supplies with immunity from Haiphong and the China border southward to the 19th Parallel. Thus the total burden imposed by the air war on North Vietnam has greatly lessened.

The past three years of the Rolling Thunder program have shown that too much should not be expected from air attacks alone. The Rolling Thunder campaign imposes a tax that the North Vietnamese must pay, but the campaign cannot stop the movement of men and supplies to the South nor will it be a decisive factor in ending the hostilities in the South.

# I. The Revised Rolling Thunder Program

The revised Rolling Thunder program has been restricted to the area south of the 19th Parallel, which contains about 10 percent of the country's population and 12 percent of the land. This area is slightly smaller than New Jersey but has only about one-fourth of the population. The primary significance of this area is that it contains the logistic corridor -- some 50 miles wide and about 200 miles long -- through which the great bulk of the military supplies and personnel needed to support hostilities in Laos and South Vietnam must pass. The scale of the Rolling Thunder program has not diminished in the second quarter of 1968, although it is now concentrated almost solely against logistical and military targets that are extremely difficult to interdict or neutralize.

The restrictions have narrowed the number and significance of the target systems that can be attacked. Only one significant powerplant exists in the area and it is not now operating. Other industry in the area consists of small factories producing consumer goods. The only portions of the rail network within the present bombing area are 25 miles of the 200-mile Hanoi-Vinh line and the 54-mile tramway located south of Vinh. Other than the logistics target system, the only military targets in the area are troop concentrations and radar and antiaircraft defenses.

Since 31 March, almost 90 percent of the population and most of the country's military, industrial, and transport centers have been free from bombing. Imports of military and war-related goods needed to support the war in the South now can be moved south as far as the 19th Parallel without interruption or loss from bombings. The manpower burdens in the northern part of the country also have eased.

In sum, the total burden imposed on North Vietnam by the air war has been greatly lessened. However, the past three years of the Rolling Thunder program have shown that while air attacks raised the cost of the war to the North Vietnamese, they could not stop the movement of men and supplies to the South nor could they be a decisive factor in ending the insurgency in the South. Even during

the heaviest bombing of the Rolling Thunder campaign in the second and third quarters of 1967, men and supplies were increasingly infiltrated into South Vietnam. Moreover, the primitive economy of North Vietnam that made little direct contribution to the war proved to be relatively invulnerable to the bombing, as long as other Communist countries continued to provide the necessities for subsistence.

## II. Scope of the Present Program

### A. Air Operations

The scale of the US air effort over North Vietnam has not been significantly reduced by the 31 March restrictions. Although the number of attack sorties during the second quarter of 1968 fell about 15 percent below the comparable period of 1967, it slightly exceeded the quarterly average for 1967 -- 27,450 compared with 26,730. Moreover, the number of attack sorties flown since the bombing restriction was almost double the number during the first quarter of 1968.

Throughout the Rolling Thunder program the great bulk of the attacks have been against targets in the Panhandle. In 1967, 67 percent of all Rolling Thunder attack sorties were flown against targets in Route Packages I, II, and III. The intensity of attacks against these route packages during the second quarter of 1968 was about one-quarter greater than the level during the second quarter of 1967. The number of attack sorties over North Vietnam by quarter during 1967 and the first half of 1968 is given in the following tabulation:

	<u>Throughout North Vietnam</u>	<u>Route Packages I, II, and III</u>	<u>Route Packages I, II, and III as a Percent of Total</u>
<u>1967</u>			
Jan-Mar	20,550	15,430	75
Apr-Jun	31,720	22,180	70
Jul-Sep	32,030	20,220	63
Oct-Dec	22,630	13,960	62
<u>1968</u>			
Jan-Mar	14,800	11,230	76
Apr-Jun	27,450	27,420	100

The approximately 67,000 tons of ordnance delivered during the second quarter of 1968 was greater than the quarterly average of 61,900 tons during 1967, and exceeded the amount delivered during the second quarter of 1967. In the second quarter of this year, attack sorties over North Vietnam by B-52 aircraft were three times the level of the

comparable period of 1967. B-52's deliver 10 times the average tonnage delivered per sortie over North Vietnam. Ordnance delivered against North Vietnam by quarter for 1967 and the first half of 1968 is shown in the following tabulation:

	Tons			
	<u>Jan-Mar</u>	<u>Apr-Jun</u>	<u>Jul-Sep</u>	<u>Oct-Dec</u>
1967	37,800	63,530	78,040	68,150
1968	33,380	67,000 a/		

*a. Ordnance delivered during June 1968 is estimated.*

#### B. Losses

Until 31 March, most US air losses over North Vietnam were sustained during attacks against the heavily defended industrial, military, and logistics targets in the Hanoi and Haiphong areas. Since the bombing halt in the North no significant deployment of Hanoi's air defense system south of the 19th Parallel has been noted. The number of SAM battalions operating in the Panhandle has not increased. Some antiaircraft artillery has been shifted to the Panhandle region, but the increase is not believed to be greater than 10 percent. Although the Bai Thuong airbase, located a few miles south of the 20th Parallel, is now serviceable for limited jet operations, both MIG activity and the scope of operations have been relatively limited.

US combat air losses were cut by more than half during the second quarter of 1968, even though the level of Rolling Thunder activity remained equal to the average quarterly rate during 1967. During the second quarter of 1968, 29 combat losses were sustained by Rolling Thunder attack sorties, compared with 72 during the same period of 1967. Thus the rate of combat losses per 1,000 attack sorties during the second quarter of 1968 was less than half that during the comparable quarter of 1967 -- 1.1 compared with 2.3. Combat losses of attack aircraft and corresponding loss rates are given by quarter during 1967 and January-June 1968 in the following tabulation:

<u>1967</u>	<u>Combat Losses</u>	<u>Losses per 1,000 Sorties</u>
Jan-Mar	36	1.8
Apr-Jun	72	2.3
Jul-Sep	77	2.4
Oct-Dec	67	3.0
<u>1968</u>		
Jan-Mar	30	2.0
Apr-Jun	29	1.1




During the second quarter of 1968, more than one-half of the US pilots and crewmen forced to eject from crippled aircraft over the relatively thinly populated area south of the 19th Parallel were rescued. This was a substantial improvement from preceding periods, when an average of less than one-third of the airmen downed over North Vietnam were rescued. The number of personnel downed and rescued, and the shares rescued in North Vietnam since August 1964, are given in the following tabulation:

	<u>Downed</u>	<u>Rescued</u>	<u>Percent Rescued</u>
Aug 1964 - Dec 1967	1,115	362	32
Jan-24 Mar 1968	87	21	24
25 Mar-30 Jun 1968	58	31	53

#### C. Target Systems

Since 31 March, armed reconnaissance missions against targets of opportunity have been emphasized even more than in the past. The lack of significant fixed installations in the area south of the 19th Parallel has eliminated the need for pre-briefed missions against fixed targets. Of the 262 targets included on the 15 July Rolling Thunder Target List (RTTL), only 10 are south of the 19th Parallel. Of these 10 targets, only three -- Vinh Airfield, the Ben Thuy Powerplant, and the Quang Khe mineable approaches -- are approved or recommended for attack; the remaining seven are either destroyed or inactive.

See the following tabulation of the ten targets on the Rolling Thunder Target List located south of the 19th Parallel:

<u>JCS Number</u>	<u>Target Name</u>	
<u>Approved</u>		
	Vinh Airfield Ben Thuy Powerplant	25X5
<u>Recommended</u>		
	Quang Khe Approaches (Mining)	25X5
<u>Inactive or Unservice- able</u>		
	Dong Hoi Airfield Bai Duc Thon Highway Bridge NW Xom Gia Highway Bridge La Khe Thon Railroad Bridge Vinh Railroad Yard NW Vinh POL Ben Thuy Lock	25X5

The principal target system south of the 19th Parallel is the logistics network -- roads, trucks, watercraft, and rail lines, dispersed storage depots, and transshipment areas. Additional targets include about 1,200 antiaircraft weapons, 37-mm or larger, and the five SAM battalions that are currently believed to be operating in the area subject to bombing.

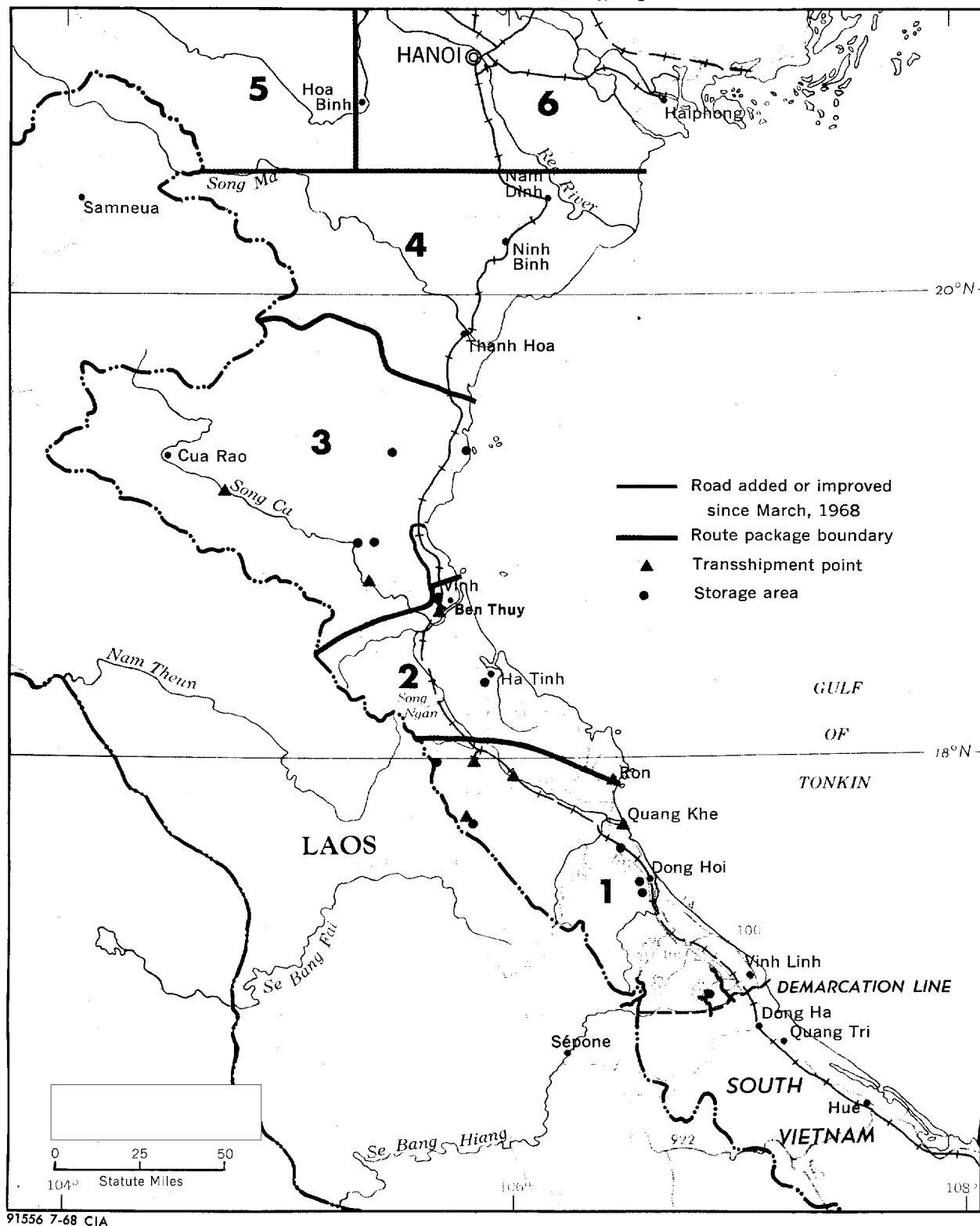
Roads are the most important transportation mode in the area, which contains about 1,900 miles, or about 25 percent of the 7,200 miles of motorable roadways in North Vietnam (see the map). There are two moderate-capacity north-to-south road networks: Routes 1A and 101, which provide access to the Dong Hoi and DMZ areas and to Routes 15 and 137, the major supply routes into Laos. An extensive network of interconnecting secondary and feeder routes, truck parks, and storage facilities enhance the flexibility

of the system and make it extremely difficult to interdict. In addition, almost all highway choke-points have one or more bypasses available. With the exception of a number of permanent bridges built prior to the bombing, these targets are relatively easy to repair and maintain. Storage areas and truck parks are nothing more than cleared areas adjacent to the roadways. Storage of supplies, particularly POL, has been dispersed along road segments making it virtually impossible to inflict significant damage.

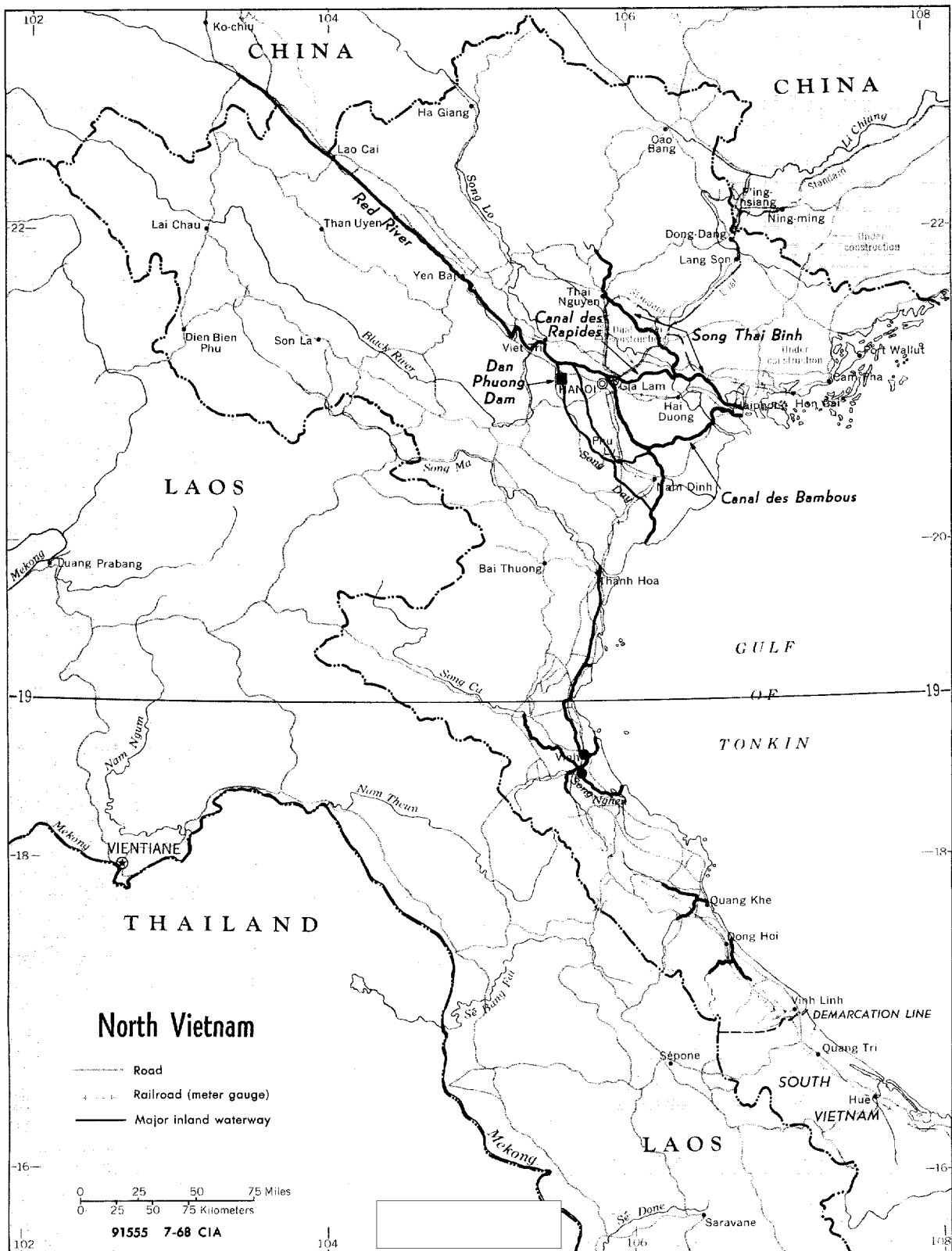
The 600-nautical-mile inland waterway network south of the 19th Parallel includes four main rivers and a number of smaller waterways (see the map). In addition, there are 170 miles of coastline. Transshipment operations can be conducted at any location along the water routes where road and rail clearances and bank conditions are suitable. Fixed waterway targets include transshipment points, river ports, and boat repair yards. The North Vietnamese have dispersed their storage areas and transshipment facilities to make them less vulnerable to air attack.

The only rail targets south of the 19th Parallel are on the 25 miles of the Hanoi-Vinh rail line and the 54-mile meter-gauge tramway which extends from a point 20 miles south of Vinh toward the DMZ. The tramway provides only secondary support to logistic activity south of Vinh and is not connected to the main network. The portion of the Hanoi-Vinh rail line south of the 19th Parallel is connected to the main railroad network, but constant attacks throughout the air war have reduced bridge capacities and restricted use of the line south of Thanh Hoa to small meter-gauge tram cars.

## North Vietnam South of the 19th Parallel



**NORTH VIETNAM: Major Inland Waterways**



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### III. Physical Damage

#### A. Miscellaneous Targets of Armed Reconnaissance

The following tabulation summarizes damage to miscellaneous armed reconnaissance targets during the first and second quarters of 1968:

<u>Targets</u>	<u>First Quarter</u>		<u>Second Quarter</u>	
	<u>Destroyed</u>	<u>Damaged</u>	<u>Destroyed</u>	<u>Damaged</u>
Road segments	<u>a/</u>	621	<u>a/</u>	1,766
Rail segments	<u>a/</u>	31	<u>a/</u>	53
Truck parks	<u>a/</u>	33	<u>a/</u>	349
Transshipment	<u>a/</u>	11	<u>a/</u>	60
Storage areas	<u>a/</u>	144	<u>a/</u>	686
Bridges	<u>34</u>	95	<u>219</u>	741

*a. Targets in these categories are virtually impossible to characterize as "destroyed."*

The dramatic increase in damage inflicted during the second quarter reflects the almost complete concentration of the attack against the logistics target system. The overall effect of this intense scale of attack has been to increase the extent of damage throughout the transport system south of the 19th Parallel and force the North Vietnamese to further disperse their transport facilities, repair the damage, or shift from one mode of transport to another.

#### B. Highway Transportation

Concentrating the air war over North Vietnam to the area south of the 19th Parallel has significantly increased the pressure on the highway system in the Panhandle and has had a deleterious effect upon the North Vietnamese logistic effort. The concentrated interdiction campaign against selected key logistic chokepoints has also forced the North Vietnamese to expend greater amounts of manpower and equipment to maintain their logistics system.

The number of motor vehicles reported by US pilots to be destroyed or damaged nearly doubled in the second quarter, compared with the first quarter.

Effective truck losses during the second quarter were 70 percent higher than the losses incurred during the second quarter of 1967, as shown in Table 1.

Table 1

North Vietnam: Trucks Reported Destroyed or Damaged  
1967 and January-June 1968

	1967			1968		
	<u>Damaged</u>	<u>De- stroyed</u>	<u>Effective Losses</u>	<u>Damaged</u>	<u>De- stroyed</u>	<u>Effective Losses</u>
Total Jan- uary - June	913	1,240	1,158	2,083	2,241	2,202
First quarter	276	248	255	870	580	653
Second quarter	637	992	903	1,213	1,661	1,549

a. The formula for computing effective losses used by CIA and DIA is as follows: 75 percent of those trucks reported destroyed and 25 percent of those reported damaged are considered to be effective losses.

The increased effectiveness of the air war against motor vehicles is the result of numerous factors including the use of Forward Air Controllers over North Vietnam, greater use of technical devices for detecting traffic at night, changes in target emphasis, and continuing high levels of truck traffic.

The reported increase in losses of trucks during the second quarter compared with the first quarter of 1968 is explained in part by the substantial increase in sorties flown and the greater

concentration during the second quarter on trucks as targets.\*

C. Railroads

Destruction and damage of railroad rolling stock fell precipitously in the second quarter of 1968 compared to the same period in 1967 and declined slightly from the first quarter of 1968, when poor weather hampered attacks against northern railroad lines (see the following tabulation).

	<u>First Quarter</u> <u>1968</u>	<u>Second Quarter</u> <u>1968</u>	<u>Second Quarter</u> <u>1967</u>
Destroyed	69	19	386
Damaged	116	36	557

The dramatic decline during the second quarter of 1968 is the result of the dearth of rail targets available south of the 19th Parallel. In addition, all the railroad equipment destroyed or damaged north of the 19th Parallel since 31 March consisted of small meter-gauge tram cars, which are not included in the overall inventory of North Vietnamese rolling stock.

\* Although enemy truck losses are clearly higher than in previous periods, there is a strong possibility that the truck loss data are exaggerated, possibly more than previously. North Vietnam has a greater capability at present to repair trucks, and trucks reported destroyed may only have been slightly damaged. Enemy deception tactics may be causing pilots to give erroneous reports. Pilot criteria for reporting trucks destroyed, as opposed to damaged, may have changed. In addition, other available intelligence is not satisfactorily consistent with the high truck kills indicated by pilot report.

By 30 June 1968 the railroad system within the present bombing area was inoperative except for shuttle operations between points of interdiction. The yard at Vinh was not in use and the railroad bridges at Tam Da and Dien Chau were heavily damaged, preventing through rail movement south of the 19th Parallel to Vinh. The combination of the lack of activity at Vinh detected in photography and the constant attacks against rail bridges north of Vinh indicates that the North Vietnamese are shifting some rail traffic south of the 19th Parallel to the highways and waterways. Constant attacks against the tramway south of Vinh have increased the extent of damage to this system and have rendered it inoperable except for shuttling.

#### D. Watercraft

Although damage to watercraft increased in the second quarter of 1968, it is well below the totals recorded for the second quarter of 1967, as shown in the following tabulation:

	<u>First Quarter</u> <u>1968</u>	<u>Second Quarter</u> <u>1968</u>	<u>Second Quarter</u> <u>1967</u>
Destroyed	305	684	1,630
Damaged	524	944	2,609

This decrease is partially attributable to an increase in sorties directed against transshipment facilities in an attempt to disrupt watercraft operations and the increased effort against trucks.

#### E. The MK-36 Program

The use of the MK-36 weapon against transportation targets throughout North Vietnam began in June 1967. Through 30 June 1968, 46,000 devices were seeded in important waterways and on roads, at rail and highway bridges, rail yards, highway ferries, and transshipment points, and at boat construction and repair facilities throughout the country. Since 31 March 1968, about 27,000 devices have been deployed, almost 60 percent of the total number of devices deployed since the program began.

The heaviest concentrations have been placed at various targets in the vicinity of Vinh, at the railroad bridges at Tam Da and Dien Chau, and at the water transshipment area at Quang Khe. Despite the heavy concentration of mines, there is yet no evidence that the weapon has denied the North Vietnamese the use of an important line of communication for more than a brief period. Heavy water traffic has been noted in several areas where a large number of mines have been seeded. The effectiveness of the weapon on truck and rail traffic cannot be determined because of the damage caused by conventional weapons.

#### IV. Manpower

The air war since 31 March has not reduced the total number of full-time civilian laborers -- 172,000 to 192,000 -- committed to bomb damage repair and transport activities. There has, however, been some diversion of labor to the southern part of the country.

Civilian labor requirements for countering the bombing south of the 19th Parallel are believed to have increased by about 15 percent -- from an estimated 78,000 to about 90,000 -- since 31 March. As many as 12,000 full-time workers probably have been shifted to the south to help in the repair of bomb damage and to keep goods moving on the LOC's. It is estimated that the 125,000 part-time workers countering the air war south of the 19th Parallel have not been increased.

The remaining 80,000 to 100,000 full-time workers that had been diverted to counter the air war north of the 19th Parallel have continued to repair past bomb damage and to strengthen the transport network as a countermeasure against a possible resumption of the bombing. Some of these workers could now be released for military duty in South Vietnam at the expense of postponing repair and construction work in the north if the North Vietnamese felt sufficiently secure that full-scale bombing would not be resumed.

## V. Indications of Continued Traffic Movements

Despite the high level of damage inflicted on the transportation system south of the 19th Parallel during the second quarter of 1968, pilots continue to report a high level of truck and watercraft movement. Other indicators also demonstrate that traffic continues at a high rate.

### A. Trucks

The increased level of truck sightings in the North Vietnamese Panhandle (Route Packages I-III) between 1967 and 1968 is summarized in the following tabulation:

	<u>Sorties</u>	<u>Sightings</u>	<u>Sorties/ Sightings</u>
<u>1967</u>			
First quarter	15,430	2,420	6.4:1
Second quarter	22,180	9,210	2.4:1
<u>1968</u>			
First quarter	11,230	6,730	1.7:1
Second quarter	27,420	12,200	2.2:1

Eighty percent more vehicles were sighted during the second quarter of 1968 than during the first quarter of this year. Part of the increase in sightings, however, is the result of improved weather, more extensive coverage of the major roads, and a sharp increase in sorties flown over Route Package II during the second quarter. These data indicate, nevertheless, that the enemy is making a major effort to continue the movement of men and supplies despite the concentrated air attacks.

The great bulk of sightings continue to be made during hours of darkness. Probably as a result of the more intense armed reconnaissance coverage of the roads and the increased use of FAC aircraft, the North Vietnamese now only infrequently concentrate trucks into large convoys for logistic movements. Instead, the trucks sighted moving on the roads typically number five or less.

### B. Watercraft

Although the number of watercraft sightings in the southern area of North Vietnam has increased substantially over the first three months of 1968, sightings this year are less than the totals recorded for the same period in 1967:

	<u>Pilot Sightings of Watercraft</u>	
	<u>1967</u>	<u>1968</u>
First quarter	4,300	3,000
Second quarter	9,600	5,500

There are other indications, however, that there has been no diminution of watercraft traffic. The number of secondary explosions and secondary fires that have resulted from attacks against waterway targets was about 100-percent greater in the second quarter of 1968 than in the same period in 1967. These secondary explosions give an indication that military cargo is continuing to move by watercraft. It is also evident that during the second quarter of 1968 larger and more modern watercraft have been employed south of the 19th Parallel. Before April 1968, it was rare to find these larger craft operating south of Thanh Hoa.

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Traffic measured in average short tons

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per day increased by more than 150 percent during the second quarter of 1968 compared with the first quarter, as shown in the following tabulation:

	<u>Average Short Tons per Day</u>
<i>First quarter 1968</i>	<i>94</i>
January	85
February	89
March	107
<i>Second quarter 1968</i>	<i>242</i>
April	215
May	238
June	274



There apparently has been a buildup of a major logistics supply base at Thanh Hoa, located immediately north of the 19th Parallel. Supplies stored here are believed destined for South Vietnam and Laos. More intense day and night traffic operations north of the 19th Parallel may also account for some of the increase.

traffic has been steadily upward since January and shows that despite the concentrated bombing in the southern part of the country, a considerable volume of supplies is moving to South Vietnam and Laos.

The destination of Rear Services shipments is known for only a portion of the tonnage -- no more than 50 percent. During the first quarter, of the known tonnage, more than 40 percent was destined for the DMZ area and areas immediately south in South Vietnam. Some 30 percent was destined for Southern Laos, and 12 percent for MR 5 in South Vietnam. During the second quarter, 40 percent of the known tonnage was designated for Southern Laos, almost 25 percent for MR 5, and only 15 percent for the DMZ area. The remaining tonnages in both quarters were for Northern Laos.

D. Traffic Through Mu Gia Pass

The increased logistic activity south of the 19th Parallel during the second quarter of 1968 is also reflected in observation of truck traffic through Mu Gia Pass. Traffic moving south through the Pass during the first six months of 1968 was 60 percent higher than in the comparable period in 1967. Traffic during the second quarter of 1968 was double the traffic noted during the second quarter of 1967. Moreover, the sharp decline in truck movements experienced in previous years during the rainy season has not yet materialized in 1968.

The estimated number of trucks moving south through Mu Gia Pass is shown in the following tabulation:

	<u>Average Number of Trucks per Day</u>	
	<u>1967</u>	<u>1968</u>
January	22	25
February	34	41
March	16	37
<i>Total</i>	<i>25</i>	<i>33</i>
April	30	52
May	16	17
June	3	19
<i>Total</i>	<i>15</i>	<i>30</i>
<i>Total January-June</i>	<i>20</i>	<i>32</i>

## VI. Countermeasures

Despite the intensification of the bombing campaign south of the 19th Parallel since 31 March, the North Vietnamese, by employing various countermeasures and expending large amounts of manpower, have been able to maintain a viable logistical system supporting heavy overland movements through the Panhandle and into Southern Laos and the DMZ area.

### A. Roads

Since 31 March the North Vietnamese have built new roads into the DMZ, built a number of bypass roads around interdiction points, and repaired and upgraded the existing network. These improvements have increased the capability of the North Vietnamese to move supplies in Route Packages I and II, and to support their forces in the DMZ area.

Work is continuing on Route 1036, a new road started in January 1968, which runs from Dong Hoi toward the western end of the DMZ. The North Vietnamese apparently intend to make Route 1036 a major infiltration link into the Laotian Panhandle to supplement Routes 137 and 15, further north. Work has progressed a few miles across the Laotian border and is within about 20 miles of connecting with Route 92 in the Laotian Panhandle. There is some evidence that this route is being surfaced with gravel to give it an all-weather capability.

### B. Bypasses

The North Vietnamese are continuing their effort to construct new bypasses for the damaged bridges which are located south of the 19th Parallel. Aerial photography indicates that they have built a total of 336 bypasses south of the 19th Parallel since the bombing program started in 1965. There is now an average of 1.3 bypasses for each of the original 251 bridges of all types that have been destroyed. Twenty-eight of these bypasses were built during the first quarter of 1968, and 23 were built during the second quarter of the year. The number of bypasses constructed south of the 19th Parallel is shown in the following tabulation:

1965-66	142
1967	143
First quarter 1968	28
Second quarter 1968	23
<i>Total</i>	<i>336 a/</i>

Total number of destroyed bridges (confirmed by aerial photography)	251
Average number of bypasses per bridge	1.3

*a. Temporary bridges, cable bridges, fords, ferry crossings, and pontoon bridges.*

Since 31 March there has been increased damage to water crossings in the area. During the first quarter of 1968 there were a total of 30 "serious damage occurrences" (SDO's)\* to original bridges and bypasses throughout all of North Vietnam. In the second quarter of the year there were 45 SDO's in the 12 percent of the country which is located south of the 19th parallel. However, there are few major water crossings in the south, so counter-measures and repairs can be carried out with relative ease.

### C. Storage and Transshipment Areas

New storage and transshipment areas continue to be detected by aerial observers and in photography. Five dispersed POL storage sites containing at least 3,100 55-gallon drums (500 to 600 tons)

*\* A serious damage occurrence consists of initial hits and re-hits and is defined as damage sufficiently severe that a crossing is denied to users until a significant amount of repairs has been performed -- requiring considerable time, materials, and labor. For example, serious damage would include a dropped span, a destroyed pier, or a destroyed abutment. Holes in a deck, cratered approaches, twisted superstructure, or a slight shifting of spans is not considered serious damage.*

have been observed along Route 137. A storage bivouac area has been detected about one mile off of Route 137 near the largest of the dispersed POL sites. A center of logistical activity has been detected at the junction of Routes 82, 151, and 1115, seven miles southwest of Ha Tinh, itself an important logistics area. The new area, which was not developed as recently as January, contains approximately 400 revetted POL drums and 20 vehicle revetments. Four rectangular POL storage revetments are also under construction.

In addition, several new storage areas, truck parks, and POL and ammunition storage facilities have been detected along Routes 72 and 110, with the facilities at Tien Luang on Route 110 recently expanded to include bunkered storage facilities, underground buildings, and revetted areas. This area serves traffic on Route 1A and is near Routes 101/137, key infiltration routes.

#### D. Airfields

There are only two airfields located south of the 19th Parallel -- at Dong Hoi and at Vinh. The North Vietnamese have never seriously attempted to repair the 5,700-foot airfield at Dong Hoi since it was first bombed in 1965. Vinh airfield also has been repeatedly bombed and was unserviceable from 1965 until early this year. The North Vietnamese started repairs in January 1968, probably in preparation for support of the TET offensive. They filled craters in the 6,400-foot runway and cleared a 3,000-foot sod strip parallel to the runway. Vinh airfield has been heavily bombed since May, however, and there is no evidence that the North Vietnamese have attempted to repair the damage.

## VII. Effect on the Movement of Personnel and Supplies

Infiltration of supplies and personnel from North Vietnam into South Vietnam during 1968 has been at levels considerably above those for 1967. Since the bombing restrictions of 31 March, movements along the infiltration corridors have reached new peaks. April was the highest month for the movement of supplies thus far in 1968, while May saw the greatest infiltration of personnel into South Vietnam. Personnel infiltration levels are expected to remain high during July and August. Logistic flows, however, will be smaller than during the past dry season although still significantly greater than during the previous rainy season.

### A. Personnel

At least 116,000 North Vietnamese have infiltrated into South Vietnam during the first half of 1968, about the same number that infiltrated during all of 1967. The peak month thus far in 1968 was July, when at least 28,000 and possibly as many as 37,000 North Vietnamese are estimated to have entered South Vietnam. At least an additional 28,000 enemy personnel are expected to enter in August. These estimates are conservative, because they include only [redacted], captured documents, and interrogation reports. Prisoner reports and captured material have consistently revealed the entry of more enemy personnel [redacted]

[redacted] For example, since 1 January 1968, MACV has uncovered evidence of the infiltration of 51,300 troops, [redacted]

[redacted] suggests that as many as 145,000 men may have infiltrated during the first half of 1968.

So far during July, only 25 battalion-sized infiltration groups involving an estimated 14,700 deployed personnel have been detected. If this deployment rate continues, the total for July should be about equal to the 17,000 detected in June. This level is roughly half that noted in March, April, and May and suggests that a decision may have been made by Hanoi not to maintain the high rate established earlier in the

year. It is not known whether this decision is the result of a shift in strategy or an assessment that poor weather conditions in Laos make mass movements impractical during the summer months.

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Identified infiltration into South Vietnam during January-August 1968 is shown in the following tabulation:

<u>Month of Arrival</u>	<u>Number Noted in Captured Material</u>	<u>Monthly Totals</u>
Jan	20,600	22,000
Feb	6,100	10,300
Mar	10,300 (2,800 <u>b/</u> )	20,300
Apr	11,800 (1,300 <u>b/</u> )	22,700
May	2,500 (500 <u>b/</u> )	25,200
Jun		15,900
Jul		27,600
Aug		28,400
<i>Total</i>	<i>51,300 (4,600 <u>b/</u>)</i>	<i>172,400</i>

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#### B. Supplies

Communist deliveries of supplies into the Laotian Panhandle during the first six months of 1968 are estimated at 225 tons a day (see Table 2). This is more than double the deliveries during the first six months of 1967.\* After deducting requirements for Communist forces and construction workers in southern Laos, an estimated 160 tons a day were available for forwarding to South Vietnam, compared with only 70 tons a day in 1967.

\* Our estimates convert truck traffic through Mu Gia Pass to tons of supplies at three tons per truck and include an estimate for supply tonnages moved on Route 137/912 and on the overland trails.

No deduction has been made for losses of supplies due to air attacks, pilferage, or breakage, which may run as high as 20 percent.

Although roadwatch data for May of this year reveal that the flow of supplies declined sharply, reflecting seasonal trends, the tonnage delivered to southern Laos is still substantially higher than during the 1967 rainy season. Indeed, deliveries during June of this year were seven times higher than those in June 1967.

Intensive construction and improvements during the past dry season have given the road network in southern Laos an increased limited all-weather capability.

Table 2

Infiltration of Supplies from North Vietnam  
1967 and January-June 1968

	Tons per Day	
	<u>Delivered to Laos</u>	<u>Available to South Vietnam</u>
<i>1967 average</i>	95	55
<i>Average January-June</i>	110	70
January	120	80
February	180	140
March	90	50
April	160	120
May	90	50
June	20	-20
July	95	55
August	5	-35
September	120	80
October	95	55
November	60	20
December	110	70
<i>1968 average January-June</i>	225	160
January	180	115
February	290	225
March	260	195
April	360	295
May	120	55
June	135	70

## APPENDIX

Developments North of the 19th ParallelIntroduction

Developments north of the 19th Parallel since the US bombing restrictions were announced point clearly to Hanoi's determination to continue its support for the war in the South and to take advantage of the bombing halt to increase the country's capability to withstand any resumption of the air war in the North. Air defense capabilities have been continuously improved. Repair of damaged bridges and new construction have improved the transport system in the North while construction of additional bypasses has made rail lines and highways less vulnerable to disruption from air attack. Repairs to the main electric power network have restored most of the plants to partial operation and some factories have resumed at least limited production. Record volumes of goods have been imported through Haiphong. Moreover, the morale of people in the North has improved because of relief from the pressures of the bombing.

Air Defense

The North Vietnamese Air Force and Air Defense organizations have enhanced their overall capabilities. The inventory of MIG fighter aircraft has been increased to about 135, of which 34 are now based in North Vietnam, compared with 25 before the bombing restrictions. The number of North Vietnamese pilots has also been increased since 31 March and some of these are now in advanced training stages on the MIG 21F aircraft. All airfields for jet operations have been repaired for full service. In addition, new airfields at Yen Bai and Bai Thuong have become operational, and new runways have been constructed at Kep and Hoa Lac airfields. Surface-to-air missile defenses have been increased from an estimated 25 to 30 battalions to 35 to 40 battalions, and there is firm evidence that a number of the new SAM battalions are equipped with an advanced guidance radar that might nullify some of our present ECM

procedures. The bulk of the SAM defenses have been kept in the Hanoi and Haiphong areas. Conventional antiaircraft artillery, however, has been shifted southward, to some extent, in response to the change in US bombing patterns.

### Logistics

The movement of goods over roads and rail lines in the north has been expedited by the repair of most of the damaged bridges. The completion of at least 15 new bypasses, many of which had been started before 31 March, has further lessened the vulnerability of the rail and road systems to air attacks. All rail lines in the north are open for through rail service except the Hanoi - Lao Cai line which is still interdicted at the 1,000-foot-long railroad/highway bridge at Viet Tri. The important Hanoi railroad/highway (Doumer) Bridge over the Red River, which had been out of service continuously since mid-December 1967, was noted repaired for rail traffic by mid-June and for truck traffic by mid-July. The Haiphong railroad/highway bridge, which was interdicted on 28 September 1967, was restored by April 1968.

New construction on rail lines and on roads has been continuing with the help of Chinese construction workers. The important Hanoi - Dong Dang line from the China border is now entirely dual gauge, permitting the use of higher capacity standard-gauge trains via the direct lines from China to the railroad yards near Hanoi. A new rail line is being constructed between Kep and the coal producing area of Hon Gai. New roads are being constructed to the China border in the northeast and the northwest.

Trains of barges are being run on the main waterways in the North, facilitating the clearing of goods through Haiphong. The use of inland watercraft during daylight hours, particularly for the distribution of POL, has become more pronounced.

### Industry

Reconstruction of North Vietnam's industry -- located almost entirely north of the 19th Parallel --

has been focused on the main electric power network, showing the importance of this branch of industry to the economy. Eight of the nine powerplants in this network are in partial operation including the Haiphong West Powerplant, which had been out of service for a year. Total electric generating capacity in operation in the network is slightly less than 50 percent of the prebombing capacity, compared with about 35 percent at the end of March and only 20 percent during much of 1967, as shown in the following tabulation:

<u>Powerplant</u>	<u>Serviceable Capacity</u> <u>(Megawatts)</u>		
	<u>Prestrike</u>	<u>Mar 1968</u>	<u>Jul 1968</u>
Hanoi	32.5	25	25
Haiphong West	10	0	5
Haiphong East	7	0	0
Viet Tri	16	4	4
Thai Nguyen	24	12	12
Bac Giang	12	6	6
Uong Bi	24	0	12
Hon Gai	15	3	3
Nam Dinh	7.5	2.5	2.5
<i>Total</i>	<i>148.0</i>	<i>52.5</i>	<i>69.5</i>

Protective blast walls have been observed either under construction or completed at all eight of the powerplants now in operation.

Of the damaged manufacturing industries, reconstruction has been noted only at the Haiphong Cement Plant. One of the seven kilns at this plant is believed to be back in operation and repair work has been observed on a second kiln. Other manufacturing plants that were only slightly damaged may have resumed partial operations now that electric power is available and the lines of communication have been improved. There has been no repair observed at the Thai Nguyen Iron and Steel Complex, which was heavily damaged by air attacks in the first half of 1967. Repair activity was noted at the Haiphong Shipyard No. 4, largest and most important ship repair facility.

Imports

During the first half of 1968 the port of Haiphong has handled nearly three-quarters of the total volume of goods that came in during all of 1967. The following tabulation shows seaborne imports through Haiphong by quarter during the first half of 1968, compared with totals for all of 1967:

	<u>Thousand Metric Tons</u>				
	<u>Total</u>	<u>Petro- leum</u>	<u>Bulk Foods</u>	<u>Ferti- lizer</u>	Miscel- laneous and General Cargoes
1967	1,417	247	462	150	558
Jan-Mar 1968	462	101	141	55	166
Apr-Jun 1968	591	119	227	39	205

The increased use of lightering, restoration of through rail service, lack of interruptions from air attacks, an increased labor force, and improvements made in the port area have permitted the North Vietnamese to unload and disperse goods with little increase in the amounts stored in the port area. Average layover time for departing dry cargo ships decreased from 28 days in March to 14 days in May and 17 days in June, but ship congestion was building up at the end of June. New construction has been pushed at the Port to provide increased berthing for freighters. The suction dredge *Zemlesos 8* was returned from China in April to carry out much needed dredging in the main ship channel.

North Vietnam's high level of petroleum imports, which began in December 1967, accelerated during the second quarter of 1968, reaching a monthly average of almost 40,000 tons -- about double the average for 1967. Consumption of petroleum is estimated to have been at least 30,000 tons per month during April-June 1968, and stocks on hand at the end of June were about 110,000 tons, equal to 110 days of supply at current rates of consumption.

### Morale

Many of the apparent pressures on the civilian population in the North have been eased by the restrictions of the bombing. The North Vietnam National Assembly met during May for the first time in two years. Foreigners traveling in Hanoi, Haiphong, and the surrounding countryside have frequently reported an air of relaxation and a widespread feeling that the bombing will not be resumed and that the war will reach some kind of conclusion soon. The regime has tried to prevent the relaxation from going too far. The long-standing evacuation of urban areas has not been rescinded, although more women and children apparently are in the cities now than before April. The construction of air raid shelters was continuing at least during May, but the enthusiasm of the people for this program apparently has lessened.

There has been little improvement in the availability of consumer goods despite the high imports thus far in 1968, suggesting that much of the imports are war-related goods, for use in the south and for stockpiling against future needs. The rice ration in urban areas still is made up partly with substitutes, as the 1968 spring rice crop once again fell below normal levels because of bad weather. There has been no indication that workers have returned from the repair of bomb damage to their former occupations. Full-time construction workers still have a great deal of repair work to do in the North. The number of part-time workers called on for bomb repair and for help in moving goods undoubtedly has declined.

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